From the risk analysis to the development of interventions and training for the prevention and control of healthcare associated infections. The experience of G. Pini Orthopedic Institute

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Abstract

Background: Health-care associated infections (HAIs) represents a phenomenon of central importance all over Europe. Every year 4.5 millions cases are detected in European Union, with 37,000 related deaths. Surgical-site infections (SSIs) are one of the most common HAIs, that are associated with an increased length of stay, re-operation rate, intensive care admissions rate, and higher mortality rate.

Methods: G. Pini Orthopedics Institute implemented in the last two years a multimodal strategy for controlling and preventing HAIs, in particular for SSIs.

Results: This paper describes the prevention’s strategies adopted for prevention of HAIs, at G. Pini Orthopedic Institute.

Conclusions: Our findings show that application of a multi modal promotion strategy was associated with an improvement in HAI prevention.

Introduction

Health-care associated infections represent a serious threat to patient safety worldwide; WHO estimate that more of hundreds of millions of patients are affected each year. 4.5 millions cases are detected in European Union every year, with 37,000 related deaths (1). Surgical site infections (SSIs), as a very common HAIs, are associated with longer post-operative hospital stays, additional surgical procedures, intensive care admissions, and higher mortality rate (2).

HAIs are preventable. Many studies showed that surveillance programs, correct antibiotic prophylaxis, training of healthcare workers are effective in HAIs prevention.

The aim of this paper is to describe the experience of the application of a multi-modal strategy for control and prevention of HAIs at G. Pini Orthopedics Institute.
Materials and Methods

In order to prevent and control HAIs in particular SSIs, G. Pini hospital applied a multi-modal strategy based on: analysis, organizational changes, training of healthcare workers and performing of good practices, staff’s feedback, implementation of the culture of safety.

Several activities have been undertaken in the last two years:
- Surveillance SSIs in interventions of arthroplasty (ISChIA project)
- Development of guidelines of antibiotic prophylaxis in orthopedic surgery and specific training for their application
- Prospective surveillance of SSIs in patients with tumors of the bone
- Prospective surveillance of SSIs in patients undergoing low complexity hand surgery
- Specific training for sentinel microorganisms identification and management
- Safety Walk Round project
- Proper management of suspected cases of Ebola virus disease.

The same methodology is applied to all our interventions, not only for the planned activities but also for crisis like Ebola. It consisted of introducing the change, educating staff, monitoring compliance, providing performance feedback, and promoting an institutional safety climate.

Results

In 2010 G. Pini Hospital in Milan participated in the surveillance program of SSIs in arthroplasty (ISChIA I and II edition) promoted by the Italian Study Group of Hospital Hygiene (GISIO) of the Italian Society of Public Health (SitI) and financed by the Centre for Disease Control (CCM) of the Italian Ministry of Health. The overall objective of the project was to evaluate the compliance with the recommendations on procedures for antibiotic prophylaxis during interventions clean replacement of hip and knee, and measure the association with the incidence of SSI. Since in the I edition it showed non complete adherence to current GLs, a review of the existing GL was set to accomplish a shared document and monitor its implementation. A multidisciplinary team was designated (consisting of two infectious disease specialists, orthopaedic surgeons, infection control nurse and doctors from the health management department) to review the existing hospital antibiotic prophylaxis GLs. Therefore information and education events were planned and a specific checklist was set ad hoc for monitoring purpose by consulting medical records. Staff training was took place in January with a conference and then with specific meetings in all units in order to allow every surgeon and the nurse coordinator to participate. In October, medical staff was invited to a survey concerning antibiotic prophylaxis GLs and then, every year, we planned a conference on prevention and control of HAIs and a survey on antibiotic prophylaxis GLs. Every physician who attended the training course have received the revised guidelines in pocket size. The study has shown a continuous improvement in adherence to GLs antibiotic prophylaxis. From the first edition of Ischia study an improvement of the adherence from 36% of 69% in the month of March 2013 was performed (3).

With the experience from the study of surveillance Ischia other prospective surveillance studies were activated: monitorage of SSI in patients with bone cancer and of SSI in patients undergoing low complexity hand surgery. In patients with malignant bone tumors, infection associated with megaprostheses have been noticed in 8% to 35% after implantation of the device and in 43% after revision surgery (4). The incidence of postoperative
infections has been steadily decreasing with the introduction of antibiotic prophylaxis. However, appropriate antibiotic use for patients having tumor prosthetic surgery is unknown and remains controversial (5). A pilot study was conducted from 2008 to 2011 at the Unit of Orthopedic Oncology; this study highlighted the need to collect additional data to identify risk factors for infective complication in orthopedic oncology surgery. Considering these results, it was planned a multicenter surveillance study involving six Italian hospitals selected on a voluntary basis. The results estimated the incidence of SSI in patients undergoing orthopedic oncology surgery and started to build of a consensus document on antibiotic prophylaxis in this particular type of surgery.

After consolidating an ambulatory low-complexity surgery path, it was implemented a prospective surveillance study on SSI in this type of surgery. In this study, surveillance systems, considering ambulatory surgery, are not centered on the hospital stay. The main aim of this study, conducted in our Hand Micro-surgery Department, was to estimate the incidence of SSI associated with outpatient surgery low complexity. The study design included a prospective active surveillance of SSI and a follow-up post discharge lasting 30 days. We focused especially in detecting risk factors for SSI such as patient characteristics, time of surgery and antibiotic prophylaxis. In addition the 80% of the cases were detected non-adherence to the guidelines of antibiotic prophylaxis and in almost all cases (98%) motivation was the administration of a prophylactic not eligible for the company recommendations.

CPE produce enzymes that can efficiently hydrolyse and confer resistance to most -lactams, including the carbapenems. In addition, many CPE strains frequently carry additional genetic determinants that confer resistance to other non- -lactam antibiotics. In the EU/EEA, data on antimicrobial resistance from EARS-Net from 2013 demonstrated that, while in most European countries rates of carbapenem resistance in invasive \textit{K. pneumoniae} isolates from blood and cerebrospinal fluid were below 1%, the population-weighted mean showed a significantly increasing trend from 4.6\% in 2010 to 8.3\% in 2013 (6). Lombardy region by decree has provided guidelines for the prevention and control of infections caused by CPE. A multidisciplinary team wrote a specific protocol and it was performed a specific training on the correct identification and management of diseases borne by Carbapenemase Producing Enterobacteriaceae. Currently we monitor that all cases of infection caused by CPE are correctly reported.

To spread a climate of security was made the Safety Walk Round (SWR). SWR is a technique of risk assessment that includes visits on the workplaces and structured and standardized interviews by members of senior management to the operators and managers of operating units and services on security issues and on the causes that can lead to adverse events or critical situations (7). The purpose of these interviews, administered to individual operators or groups, is to detect actual or potential risks that can lead to adverse events for patients and to identify the measures that could prevent its occurrence. We used the questions Frankel’s model questions, and the issues raised are classified according to the taxonomy proposed by Vincent. Based on the information acquired are identified, evaluated and introduced consistent preventive measures to improve patient safety. The purpose of the project
was the implementation of an activity of SWR at three pilot university departments inside the hospital. These units deal with diseases from the emergency room and the risk of criticality is greater than the others departments. During 2014 we identified and trained the staff and we started the interviews in departments. Before making the interviews the activity was presented to the staff of the departments with an informative brochure. During each SWR meeting a multi professional group was interviewed, of them at least four to five active players in the task force: medical directors, nurses and others operators depending on the type of operating unit. The nursing coordinator and the director of the structure were interviewed separately. During 2015 the project will be implemented in others departments.

During 2014 we developed and shared guidelines for Ebola virus suspected cases management. According to national and regional provisions, we have prepared a specific protocol in order to minimize the risk of spread of virus Ebola from assisted patients with suspected disease to other patients, to the personnel and to the visitors. We also implemented training interventions. We conducted a staff-training course with audiovisuals about donning, undressing and correct use of personal protective equipment.

Discussion

Patient safety is one of the most discussed theme in health-care: HAIs have a mainly relevance about this. Not all the infective complications determined by health-care are avoidable; however, the risk of infection can be significantly reduced having knowledge of the “safe” established practices to be used when treating the patients. Systems capable of ensuring the adoption, in practical clinic, of professional “safe” behaviors, are able to significantly reduce the risk for the patient to acquire an infection (in some studies up to 70%) (8). Surveillance activities on nosocomial infections is extremely relevant in prevention’s programs (9, 10), also the respect of Guidelines (11, 12). The main purpose of the guidelines is to reduce the variability of the behaviors in clinical practice, this aim is easily achieved if the guidelines are shared with the medical staff. Staff training is very useful for control and prevention of HAI, sharing of the guidelines is crucial for effective implementation of the recommendations (13). It is also very important to communicate results of the monitorage to promote opportunities for comparisons between all the staff (14).

The WHO suggests a multimodal strategy to improve hand hygiene (15). We tried to use this strategy alongside the surveillance which is a measure of prevention, above all for SSIs. The multimodal strategy was introduced in several areas, not only in planned activities but also in situations of emergency health, as in the case of Ebola. This strategy provides for the involvement of the Health-care staff (surgeons, anesthetists, pharmacists, medical directors), with which we focus mainly on organizational issues, after observing the different practices. The observation of practices is critical to comfort caregivers with their behavior and the real responsibility. The effect of the intervention on the prevention of hospital infections has proved good in all activities in the hospital, as shown by the results obtained. The study on monitoring in arthroplasty (Ischia), demonstrated an improvement of the adhesion to guidelines from 36%, recorded in the first edition, to 69% by the month of June 2014. Regarding emergency Ebola, the specific behaving protocol and the training of health personnel have demonstrated to be useful for the proper management of potential or real risk conditions.
Conclusion

Our findings show that application of a multimodal promotion strategy was associated with an improvement in HAI prevention. Also the study showed not simply an activity of control and prevention of HAI inside G. Pini Orthopedic Institute but also a constant improvement.

References


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